CLAIMS

Claim 1 (Previously Presented) An optimization method for optimizing an order of component mounting in a component mounting system having a plurality of mounters for mounting components onto a board,

wherein each of the mounters includes a respective component supply unit and a respective placement head for picking up components from the respective component supply unit and for mounting the picked-up components onto the board,

wherein the board includes a plurality of component patterns according to which components are mounted thereon, each of the component patterns having a same component placement structure,

wherein the mounters are for mounting components onto the board according to one of (i) the component placement patterns of the board and (ii) groups of component placement patterns of the board,

wherein each of the one of the component placement patterns and the groups of component placement patterns identifies a specific mounting arrangement of specific components to be mounted onto the board, and

wherein the board is transported from a first mounter located upstream to a second mounter located downstream, such that the components are mounted onto the board in an order starting from the first mounter and continuing to the second mounter,

the optimization method comprising:

respectively allocating components to each of the mounters on one of a (i) per component placement pattern basis and (ii) per group of component placement patterns basis,

such that, during the transporting of the board, the placement head of each of the mounters mounts every component of one of a respective component placement pattern and a respective group of component placement patterns, representing partial regions of the board, and such that all of the respective placement heads of the plurality of mounters mount the components onto the partial regions of the board resulting in the components being mounted onto every region of the board.

Claim 2 (Previously Presented) The optimization method according to Claim 1, further comprising optimizing the order of component mounting for any one component placement pattern among a plurality of component patterns.

Claim 3 (Previously Presented) The optimization method according to Claim 1, wherein the respectively allocating of the components further comprises:

determining, from (i) a total number of component placement patterns of the board and (ii) a number of available mounters in the component mounting system, a number of respective component placement patterns to be allocated to each respective mounter so that the number of respective component placement patterns allocated to each respective mounter is approximately the same; and

allocating the number of respective component placement patterns determined by the determining of the number of respective component placement patterns to any of the plurality of mounters for component mounting.

Claim 4 (Previously Presented) The optimization method according to Claim 3, wherein the determining of the number of respective component placement patterns further comprises:[[:]]

calculating a quotient and a remainder by dividing the total number of component placement patterns of the board by the number of available mounters;

determining the quotient as the number of respective component placement patterns to be allocated to each respective mounter, in a case where the remainder is zero; and

in a case where the remainder is one or greater, (i) determining a number, which is the quotient plus one, as the number of component placement patterns to be allocated to a number of mounters equal to the remainder, starting from the first mounter, and (ii) determining the quotient as the number of component placement patterns to be allocated to mounters not having the quotient plus one as the number of component placement patterns allocated thereto.

Claim 5 (Previously Presented) The optimization method according to Claim 3, wherein the determining of the number of respective component placement patterns further comprises:

calculating a quotient and a remainder by dividing the total number of component placement patterns of the board by the number of available mounters; and

first determining the quotient as the number of respective component placement patterns to be allocated to each respective mounter.

Claim 6 (Previously Presented) The optimization method according to Claim 5, wherein the determining of the number of respective component placement patterns further comprises second determining the remainder as a number of component placement patterns to be commonly

allocated among the plurality of mounters.

Claim 7 (Previously Presented) The optimization method according to Claim 6, wherein, in the second determining, the number of component placement patterns to be commonly allocated to the plurality of mounters is determined so that a time for component mounting for each of the mounters is approximately the same.

Claim 8 (Previously Presented) The optimization method according to Claim 6, wherein, in the allocating of the number of respective component patterns, the component placement patterns to be commonly allocated to the plurality of mounters are located in positions on the board at which components can be mounted by the plurality of mounters.

Claim 9 (Previously Presented) The optimization method according to Claim 6, wherein the plurality of mounters includes all of the mounters included in the component mounting system.

Claim 10 (Previously Presented) The optimization method according to Claim 3, wherein, in the allocating of the number of respective component placement patterns, the determined number of respective component placement patterns are allocated to each respective mounter based on which components are to be mounted, so that borders between the determined number of respective component placement patterns allocated to each respective mounter are set orthogonally to a direction in which the board moves through the component mounting system.

Claim 11 (Previously Presented) The optimization method according to Claim 1 further comprising determining a position of the board during component mounting so that a moving distance, from a default position to an allocated pattern, of a head of each of the mounters is uniform for all of the mounters, the head being used for mounting components onto the board.

Claim 12 (Previously Presented) The optimization method according to Claim 1 further comprising determining placement positions of component cassettes used in component mounting so that a distance from the placement positions of the component cassettes to an allocated pattern, for each of the mounters is uniform.

Claim 13 (Cancelled)

Claim 14 (Previously Presented) A computer-readable recording medium having a computer program recorded thereon, the computer program for optimizing an order of component mounting in a component mounting system having a plurality of mounters for mounting components onto a board,

wherein each of the mounters includes a respective component supply unit and a respective placement head for picking up components from the respective component supply unit and for mounting the picked-up components onto the board, wherein the board includes a plurality of component patterns according to which components are mounted thereon, each of the component patterns having a same component placement structure,

wherein the mounters are for mounting components onto the board according to one of (i)

the component placement patterns of the board and (ii) groups of component placement patterns of the board,

wherein each of the one of the component placement patterns and the groups of component placement patterns identifies a specific mounting arrangement of specific components to be mounted onto the board, and

wherein the board is transported from a first mounter located upstream to a second mounter located downstream, such that the components are mounted onto the board in an order starting from the first mounter and continuing to the second mounter,

the computer program causing a computer to execute an optimization method comprising:

respectively allocating components to each of the mounters on one of a (i) per component placement pattern basis and (ii) per group of component placement patterns basis, such that, during the transporting of the board, the placement head of each of the mounters mounts every component of one of a respective component placement pattern and a respective group of component placement patterns, representing partial regions of the board, and such that all of the respective placement heads of the plurality of mounters mount the components onto the partial regions of the board resulting in the components being mounted onto every region of the board.

Claim 15 (Previously Presented) A mounter for mounting components on a board according to a mounting order optimized through an optimization method for optimizing an order of component mounting in a component mounting system having a plurality of mounters for mounting components onto a board, the mounter comprising:

a component supply unit; and

a placement head operable to pick up components from the component supply unit and operable to mount the picked-up components onto the board,

wherein the board includes a plurality of component patterns according to which components are mounted thereon, each of the component patterns having a same component placement structure,

wherein the mounter mounts the components onto the board according to one of (i) the component placement patterns of the board and (ii) groups of component placement patterns of the board, and

wherein each of the one of the component placement patterns and the groups of component placement patterns identifies a specific mounting arrangement of specific components to be mounted onto the board,

wherein the board is transported from a first mounter located upstream to a second mounter located downstream, such that the components are mounted onto the board in an order starting from the first mounter and continuing to the second mounter, and

wherein the optimization method includes respectively allocating components to each of the mounters on one of a (i) per component placement pattern basis and (ii) per group of component placement patterns basis, such that, during the transporting of the board, the placement head of each of the mounters mounts every component of one of a respective component placement pattern and a respective group of component placement patterns, representing partial regions of the board, and such that all of the respective placement heads of the plurality of mounters mount the components onto the partial regions of the board resulting in

the components being mounted onto every region of the board.

Claim 16 (Previously Presented) An optimization apparatus for optimizing an order of component mounting in a component mounting system having a plurality of mounters for mounting components onto a board,

wherein each of the mounters includes a respective component supply unit and a respective placement head for picking up components from the respective component supply unit and for mounting the picked-up components onto the board,

wherein the board includes a plurality of component patterns according to which components are mounted thereon, each of the component patterns having a same component placement structure,

wherein the mounters are for mounting components onto the board according to one of (i) the component placement patterns of the board and (ii) groups of component placement patterns of the board,

wherein each of the one of the component placement patterns and the groups of component placement patterns identifies a specific mounting arrangement of specific components to be mounted onto the board, and

wherein the board is transported through the component mounting system from a first mounter located upstream to a second mounter located downstream, such that the components are mounted onto the board in an order starting from the first mounter and continuing to the second mounter,

the optimization apparatus comprising:

an optimizing unit operable to optimize the order of component mounting for any one component mounting pattern among the plurality of component mounting patterns; and

an allocating unit operable to respectively allocate components to each of the mounters on one of a (i) per component placement pattern basis and (ii) per group of component placement patterns basis, such that, during the transporting of the board, the placement head of each of the mounters mounts every component of one of a respective component placement pattern and a respective group of component placement patterns, representing partial regions of the board, and such that all of the respective placement heads of the plurality of mounters mount the components onto the partial regions of the board resulting in the components being mounted onto every region of the board.